IMPERIAL MYCOLOGICAL INSTITUTE
- 6 JAN. 1936

COLONY AND PROTECTORATE OF NIGERIA

REPORT

ON THE

Agricultural Department

FOR THE YEAR

1934

Price : Two Shillings and Sixpence net

LAGOS :
PRINTED AND PUBLISHED BY THE GOVERNMENT PRINTER
To be purchased from the C.M.S. Bookshop, Lagos, and from
The Crown Agents for the Colonies, 4, Millbank, Westminster, London, S.W.1
1935

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Annual Report on the Agricultural Department, Nigeria, 1934.

Introductory.

1. Progress in nearly all of the department's major lines of extension work was greatly retarded this year by the low prices of most of our agricultural products. The difficulties encountered arose not so much from the fact that farmers found themselves so poor, as from the psychological effect of the continued decline; for the time looked to be getting very near when produce would be unsaleable at any price. It is, for instance, hardly to be expected that any one will buy a palm press to extract more oil when oil is barely saleable and getting cheaper every month. Again, only the most courageous and enterprising farmers will take up mixed farming when the value of groundnuts is so low as to make the repayment of the loan an inordinately heavy burden for the future. Thus the fact that substantial progress can again be recorded this year shows that many farmers have remarkable confidence in the soundness of the department's various recommendations. So much progress, achieved in such a difficult year, justifies expectation of much better results as soon as prices improve at all.

Relations with Native Administrations.

2. It is a great pleasure to me to record the department's appreciation of the help received from the Native Administrations in the areas in which we work, and from the Administrative Officers who direct those administrations. The relations which obtain between the Native Administrations and this department are generally excellent. This statement, allowing for the very different circumstances in the Northern and Southern Provinces, applies equally to both groups.

3. Co-operation with the Native Administrations necessarily entails, on the department's side, a maximum of decentralisation and delegation of responsibility from the Assistant Directors to each provincial Superintendent of Agriculture. The provincial officer cannot act as adviser to his local Native Administrations, nor co-operate effectively with the local divisional officers, if he has at the same time to refer everything to his Assistant Director. All the general lines of his policy must be laid down by the Assistant Director, and on the strictly technical side, such instructions must inevitably cover points which may appear to be details, but are technically important. This is inevitable but at the same time every decision which can possibly be left to the man on the spot should be so left to him. In discharging such wide responsibility, the local Superintendent of Agriculture has to exercise much discretion and judgment, for he has to ask for the money which he considers necessary to be allocated by the Native Administration for agricultural work, yet at the same time he must avoid being importunate or unreasonable, let alone extravagant. He is held entirely responsible for the efficiency of the agricultural work of the Native Administration, but at the same time he must not usurp the responsibility of the Administrative Officer who is the general adviser of the Native Administration, and he must even more scrupulously avoid any infringement of

the authority and responsibility of the executive officials of the Native Administration. To do all this to everyone's satisfaction needs more than purely technical knowledge and judgment. It is no exaggeration to say that the provincial Superintendents of Agriculture generally discharge these functions with conspicuous success. It need hardly be said that they could not do so if the Assistant Directors did not do their part by giving the Superintendents the help and guidance they need, and no more.

Increase of Staff.

4. Consistently with the principle that the cost of agricultural extension work should be shared between Government and Native Administrations, an arrangement has been approved whereby half the salaries and other personal charges of all the Superintendents of Agriculture who are engaged on such work in the richer Northern Emirates is to be reimbursed to Government. It was an essential part of the agreement that at the same time the total number of officers engaged on extension work in those Emirates should be increased. The staff of Superintendents of Agriculture in the Northern Provinces has accordingly already been increased by four, and we now have, a staff adequate for the areas in which we have hitherto worked, and have also been able to extend our operations to two other small areas, viz., south-western Sokoto and southern Zaria.

Locusts.

5. The infestation of locusts was rather more serious in 1934 than was expected; and there were more swarms present in October and November, 1934 than in the corresponding months of 1933. These swarms entered Nigeria from the north and north-east. The destruction of the second generation of hoppers was, so far as can be judged, reasonably effective. That generation is bred in the north of Nigeria where the country is more heavily populated, and where the people, having suffered more from locusts in the past than those further south, assist the Administrative Officers in the campaign of destruction with more enthusiasm, or perhaps it would now be more accurate to say with less apathy, than those further south, where the first annual generation of hoppers occurs. The amount of damage done this year was inconsiderable except in one or two small parts of the areas inhabited by pagan tribes in the Northern Provinces. "Acha" (*digitaria ternata*, a fine grass seed) which is such a great favourite with those tribes is also a favourite food of the locusts and is always damaged much more than the guineacorn grown by the Hausas. The amount of damage done to the "acha" crop is such that some villages will have little to spare for making into beer, but few, if any, should be seriously short of food.

6. The study of locusts in their habitats in the vicinity of Lake Chad was continued again this year by Mr. Gwynn, the entomologist temporarily engaged especially for this purpose. He confirmed the conclusions which were detailed in last year's report, *i.e.*, that it is unlikely that the British territory near the lake comprises or includes an outbreak centre of any species of locusts; but that on the other hand there is a possibility, if not indeed a probability, that the French territory near Chad immediately to the east of the frontier is a genuine potential outbreak centre of the Red Locust, and that the extreme western portion of this outbreak centre slightly overlaps the international boundary. As a part of Nigeria's share in the international campaign of locust research, it has been arranged that Mr. Golding, now the sole entomologist

of this department, will meet a French entomologist in April, 1935, and that they will study the whole area that is suspect on both sides of the border. It is also part of our duty towards the rest of Africa that we should keep sufficent watch upon the remainder of the British Chad area, so as to have timely knowledge of any future outbreak of the gregarious phase of any of the species of locusts there. In pursuance of this end, Mr. Golding will carry out a patrol of investigation of British Chad again this year. Apart from the special investigation in co-operation with the French just mentioned, it is hoped that in future no more will be needed than an annual, or possibly even a biennial patrol of a few weeks' duration.

AMERICAN COTTON IN THE NORTHERN PROVINCES.

7. Purchases of American Seed Cotton for Export Expressed as Bales of Lint each 400 lb. nett.

	Seed distributed.	Cotton bought.	Price paid per lb. of seed-cotton.
	Tons.	Bales.	
1924–25	2,656	27,996	3d.
1925-26	2,990	37,356	2½d.
1926–27	3,372	16,659	1⅛d.–1¾d.
1927–28	2,220	16,316	2⅜d.–2½d.
1928–29	2,640	24,686	2¼d.–2⅛d.
1929–30	3,173	34,389	1·6d.–1·2d.
1930–31	2,719	13,849	·5d.–·8d.
1931–32	1,569	4,811	·6d.–·8d.
1932–33	1,674	22,228	·8d., ·9d., ·8d.
1933–34	2,376	23,013	·8d.–1·2d.
1934–35	3,807	49,444 *	1·1d.–1·5d.

*Approximate to March 31st, 1935.

As the table above shows, the purchases of American cotton for export in 1934-35 were greater by some 35% than in the best previous year (1925-26). The estimated production of bales in the season 1934-35 is based upon an assumed ginning out-turn of 30%; but as this percentage out-turn is more likely to be a little too low rather than a little too high, it is probable that the actual final total, which only becomes available when ginning is finished, will exceed 50,000 bales. In view of the fluctuations of this crop in the past, it might well be asked whether this year's increase can be regarded as representing any permanent progress or should be looked upon merely as an exceptional occurrence likely to be followed by a series of years as lean as some of those that have occurred before. Our big cotton crops result from the simultaneous occurrence of three factors—a large number of fields being planted with cotton, attention being given to timely sowing, good weeding

and cultivation of those fields, and the occurrence of favourable weather. The weather of 1934 was undoubtedly favourable, and the crop would not otherwise have been so big as it was; but, on the other hand, the weather of 1934 was not so favourable as that of the two previous years of big crops. The increase this year over the crops of those two previous good years is therefore to be ascribed to increased planting and the timely sowing of more of the fields. These, of course, were in turn due to the price paid for cotton last year, and to the relation between that price and the price of groundnuts and grains; and we shall no doubt have set-backs again in the future when the price of cotton falls, or when the season's weather is very unfavourable. But it is the belief of the agricultural officers concerned that the farmers of Zaria and Southern Katsina, and even of the eastern part of Sokoto, have now quite a different idea about cotton to that which they held a few years ago. In those districts cotton is now no longer regarded as a speculative side-line, but as the most important crop on the farm. In consequence, although there is still room for much improvement in their methods of growing cotton, the farmers do now tend to sow it in better time, to use better land for cotton, and to give it more weeding. Thus there is every reason to believe that this year's increase of production really represents a step in a progress which has not yet reached its end.

8. It would seem that even now, after ten to fifteen year's experience with American cotton, the native farmer's methods are still influenced by his earlier experience with his indigenous variety. The native cotton used to be grown as a biennial crop, planted late in one season to make its growth and bear its crop during the following one. Because of this method of growing it, as well as because of its bushy habit, the indigenous cotton needed very wide spacing; and many farmers, presumably in consequence of that practice, still space their American cotton too widely. It is probably no exaggeration to say that if cotton in every cotton field in the Northern Provinces were properly spaced, the total export would be increased by 20%. An even bigger increase would result if every field were planted at the optimum date. But this is the counsel of a perfection which cannot be attained; for the farmer in the Northern Provinces has to work against time, and, in the main cotton belt, many fields are sown with cotton when it is too late to plant anything else. It is obviously better that cotton should thus be planted late rather than that those fields should not be used at all. But it would also seem that more cotton could be planted in good time than is so planted as yet.

Cotton Marketing System.

9. The buyers employed by the exporting firms to purchase seed cotton have in recent years taken to giving out advances to farmers against the cotton crop before it is picked. The earlier collection of taxes that has been in force in recent years has probably tended to encourage the growth of this system, though it would doubtless have grown up even without such encouragement. In order to make sure of getting the cotton due to them against their advances, the buyers have to collect the cotton in the villages instead of leaving the producers to take it to the central markets. The buyers now simply use the central markets to deliver their cotton in bulk to their employers. Under this system the crop is paid for months before it is picked, and consequently neither the producers nor the native buyers employed by the exporters pay any attention to whether it is picked cleanly, or even whether it is allowed to ripen fully before being picked. The

farmer feels that he has already got his money and that his return does not depend on the quality of his produce, while the buyer is forced to take whatever he can get in order to recover the value of the money already paid out. The class of cotton of Northern Nigeria is still relatively high as compared to that of many cotton growing countries, but it is also distinctly lower than it was a few years ago. It is evident that a reform of the marketing system is essential; and the exporters have indicated their willingness to co-operate with the department in effecting such a reform. The adoption of such a helpful attitude by the firms marks an important advance. Experience shows that such co-operation is essential to the successful working of any grading scheme in this country. At my suggestion, a committee was appointed by the Chief Commissioner of the Northern Provinces to make recommendations on this subject, and regulations have been framed which it is hoped will be in force next season. There is every reason to hope that they will soon lead to an improvement in the class of cotton exported, and also ensure that the producer obtains the value of the cotton that he sells.

Improved Varieties of American Cotton.

10. As explained in last year's report, the best improved strain of American cotton introduced by the plant breeders in the Northern Provinces hitherto was one called strain L. The lint of that variety was definitely, although only slightly, superior to that of the ordinary mixture of strains generally grown at present. The strain L also yielded a little better, if anything, than the ordinary mixed strains on good land; but it also undoubtedly yielded a little less than the ordinary mixture on poor land. In spite of this admittedly unsatisfactory position, it was decided to multiply the seed of strain L with the intention of distributing it for cultivation by farmers, in replacement of the ordinary mixture. But as a result of this year's experiments, it has been decided to discard strain L. The reason for this is that a later selection, No. D 31, which was handed over by the plant breeders for trial on a farm scale last year, promises to be a much more profitable variety for the farmer than either strain L or the ordinary mixture of strains. D 31 is a very hardy variety, and tests at one or two farms last year and on all the farms under our control this year, show that it gives a consistently heavier yield per acre, whether on good land or on poor land, than the ordinary mixture or the strain L. The proportion of lint to seed cotton in D 31 is also very high. Taken together, these two factors will probably cause an average increase of fully 20% in the yield of lint per acre if the ordinary mixture is replaced by this strain. It is not yet possible for a final judgment to be reached about the quality of the lint of the D 31 variety. Reports on one series of samples sent to England last year indicate that the quality of its lint is probably a little, but only a little, below that of the ordinary mixture. It would seem that the slightly lower value per pound of the lint of D 31, if it should indeed prove to be slightly inferior to the ordinary lint, would not cancel out the value of the increase in yield.

Ginger Extension Work.

11. There has been a very satisfactory increase in 1935 of over 150% in the production of sun-bleached ginger for export. The amount bought for export each year since 1931, when the trade first started, has been as follows :—

1930-31	15 tons.	1933-34	86 tons.
1931-32	39 tons.	1934-35	221 tons.
1932-33	53 tons.		

The prices paid were a little higher than last year :—

Grade.	*1933-34.*	*1934-35.*
1	4d.	4d.
2	$3\frac{1}{2}$d.	$3\frac{1}{2}$d.
3	$2\frac{5}{8}$d.	$2\frac{3}{4}$d. and later 3d.
4	$1\frac{1}{2}$d.	$1\frac{1}{2}$d.

The quantities of the various grades were as follows :—

Grade.	*1933-34.*	*1934-35.*
1	.1 tons	.2 tons.
2	2.6 tons (=2.5%)	11.5 tons (=5%).
3	80.1 tons (=92%)	171.1 tons (=77%).
4	3.4 tons (=5%)	30.5 tons (=17%).

As is shown by the prices quoted above, and by those which we understand are obtained for the different grades when they are sold in England, ginger is a crop in which quality is of the utmost importance. Quality in ginger depends mainly on two points, first the external colour, and secondly the size of the roots. The colour depends on careful scraping and repeated washings, each washing being followed by rapid sun-drying in the strong sun and very dry air of our dry season. This rapid sun-drying bleaches the ginger in a way which in many other climates can apparently only be attained by the use of the fumes of burning sulphur. In this matter of the preparation of the ginger, the pagan people who produce this crop have responded remarkably well to continued instruction by the departmental officials. There is still a tendency to whiten the ginger with white earth, which, although it amounts only to a minute proportion, yet very greatly lowers the market value of the ginger, because any evidence of such treatment naturally causes the produce to be regarded with suspicion when it comes to be sold in England. However, our steady refusal to pass any such samples at the markets, together with much propaganda, keeps this fraudulent practice in check. The increased proportion of Grade IV ginger, 17% as against 5%, is not so serious a matter as might appear at first sight. For one thing the grading of the ginger was again stricter this year than ever before, and some of that which became Grade IV this year would have passed as Grade III last year. Again some of the actual increase of inferior ginger is due to the larger number of villages which have taken up ginger production this year for the first time and who had thus not yet fully learnt the method of preparing it. But these two factors do not account for all of the increase in the amount of Grade IV and the remainder must be ascribed to the use of inferior " seed " or inferior, unmanured, land. It is hoped that, through propaganda and by providing a greater supply of good " seed ", it will be possible to reduce the proportion of Grade IV again before long, now that we have a Native Administration farm in the district, and a Superintendent of Agriculture permanently stationed there.

12. The first and second grades differ from the third only in the matter of the size of the pieces. To obtain second grade ginger it is necessary not only to produce larger roots but also to separate them from the smaller ones which always occur, to a greater or less extent, even in the best fields. Experiments, and the results also of distributing improved seed to selected villages, have now shown quite conclusively that by selecting and multiplying strains of large roots, and selling such planting material to the growers, we can effect a marked increase in the general size of the roots of the resulting crop. Indeed the increase in the quantity of second grade ginger produced in 1934-35 is roughly the measure of our progress in this work during the year.

13. Except for a trial consignment of ten tons or so, which was bought this year by another firm, the whole of the ginger so far has been purchased by one company. That buyer has given the department an entirely free hand in the matter of grading, and in ordering sellers to take baskets of ginger away to be re-washed or re-picked when necessary. Under these circumstances it has been possible to use the markets as a means of educating the growers, and giving force to what is taught in the villages at the time when the product is in course of preparation. But with a product of which the value depends so much upon quality, there is no doubt that it would only need a very short period of unrestricted competitive buying to undo all that we have done. It may be possible to continue our present system so long as there are only two buyers of this crop. But if there should arise any considerable amount of competition for its purchase, then there is no doubt that a marketing system will have to be enforced by regulations, more or less similar in effect to those about to be introduced for the control of marketing for seed cotton in the Northern Provinces. Ginger marketing is however somewhat complicated by the fact that it is produced by pagan tribes, who as yet have had little contact with buying firms or markets or even with African traders of any kind, and are still so unused to modern conditions that they will only come to the market if the whole tribe comes in together under the guidance of their chiefs. However, it will no doubt be possible to devise some satisfactory system when it becomes necessary.

Extension of Mixed Farming.

14. The meaning with which the term "Mixed Farming" is used in this department has been fully explained in previous reports. The following figures show the progress made in the introduction of the system:—

		No. at end of previous season.	No. starting first time.	Failures* during the season.	No. continuing at the end of the season.
1928 ...	Total	Nil	3	Nil	3
1929 ...	„	3	9	5	7
1930 ...	„	7	13	3	17
1931 ...	„	17	31	4	44
1932 ...	„	44	71	7	108
1933 ...	„	108	84	19	173

* "Failures" include all men who give up the system for any cause, including even death, when the heir is not capable or willing to continue the system.

	Emirate.	No. at end of previous season.	No. starting first time.	Failures* during the season.	No. continuing at the end of the season.
1934.	Zaria	101	36	6	131
	Katsina ...	36	38	3	71
	Daura	3	13	...	16
	Kano	8	7	...	15
	Gumel	2	5	...	7
	Kazaure ...	2	7	...	9
	Sokoto	20	30	5	45
	Gwandu ...	1	2	...	3
	Argungu ...	...	1	...	1
		173	139	14	298

* "Failures" include all men who give up the system for any cause, including even death, when the heir is not capable or willing to continue the system.

15. The following table shows the social positions of the farmers in the various provinces :—

	N. A. Executive Officials.	Village Heads.	Peasant farmers.	Others.	Total.
Zaria	13	20	84	14	131
Kano	17	5	7	2	31
Katsina	25	28	23	11	87
Sokoto	29	12	4	4	49
Total ...	84	65	118	31	298

The figures indicate an amount of progress which is not unsatisfactory in view of low prices of Agricultural products last year. But the number who were " set up " in 1934 is smaller than it would have been had times been better, and also is only about one-third of the number of new farmers whose establishment is already arranged for in 1935-36. However, if the progress in 1934-35 was not quantitatively so great as we had hoped it would be, it was qualitatively very satisfactory in nearly all districts. The farmer who took up the system for the first time in 1934-35 seemed generally to be altogether more efficient and enterprising than the great majority of those who had started previously. Certainly many of the men who started in 1934 did as well in their first year, as did many of those who were now already in their second year. No doubt this was largely because the new men of 1934 had learnt much from the earlier converts, and partly because the success of those earlier converts has now led to the more simultaneous acceptance of all the recommendations we make : for there used to be a tendency for new farmers to adopt only some of the measures—not always the same ones—out of the several which, together, constitute our system, and must all be accepted together, as a whole, if the farmer is to derive full profit from the new system. But, after allowing for all these factors, it still seems that we have this year brought on to our list a larger proportion than previously of the best type of farmers.

16. Thanks to the spreading of the repayment of the loans over a period of four years instead of three, as explained in last year's report, and thanks to favourable weather and better prices this season, little difficulty has been experienced in the collection of the repayments due on this year's account and of the arrears outstanding from last year. For instance, in Zaria, out of £201 11s. 3d. due to be paid to the Native Administration during the financial year, 1934-35, all but £7 15s. had been repaid by 10th April, 1935, and it is anticipated that the remainder will be repaid during April.

17. As explained in last year's report, it had already become clear that if cattle are to be handed over to new farmers on the advance system in such good condition that hard work will not lead to the breaking out of the dormant trypanosomiasis with which many of the cattle are infected, then the cattle needed for the farming season of 1935 must be bought from the nomad herds in the latter part of the rains of 1934 and kept on farms during the dry season, so that they could be reasonably well fed until they start work. During the same period the cattle have also to be inoculated against contagious diseases and to be broken into work. The men who are to drive the cattle have also to be taught. Now for next season (1935) we are setting up some 130 new men in the Zaria

Province alone. To feed even 260 head of cattle during the dry weather and to train them, and to train 130 men in the keeping and working of cattle, would be quite a considerable and expensive operation if it were all done at one centre, or even at two or three centres. But there is every reason to hope that in two or three year's time we shall be setting up several times that number each year in each province. If it is to be done without great expense, it is evident that it can only be done by one method. The principle must be that every established, good mixed farmer should keep and train one or two pairs of bullocks and their prospective drivers for those of his neighbours who are about to take up the system for the first time. It is worth while for the established farmers to do this for the new-comers, for the sake of the extra manure that the instructors thus obtain on their own farms. The manure thus obtained must be worth something like ten shillings or fifteen shillings for each pair of bullocks maintained during the dry weather; though there are few farmers, if any, who as yet realise that it is so valuable. The generally good relations between neighbouring farmers here also seemed to favour the possibility that this system might prove successful. A trial has therefore been given to it this year and so far the arrangement has been so satisfactory as to appear capable of application on a very large scale, or at least on such a scale as we expect to be necessary during the next three or four years.

18. The ordinary peasant farmers who take up this system would be quite incapable of doing so without the help of an advance from the Native Administration. Indeed, even the sum of five shillings which we demand that each man should pay in the first instance towards the cost of his equipment is quite a large sum for the poorer of them. In dealing with such poor people, it is obviously essential that the advances with which they are debited at the beginning for the purchase of equipment should be as small as possible; for there is no doubt that the idea of being in debt to the extent of £5 is alarming to people to whom that represents a very considerable sum of money. In order, therefore, to keep the advances low, it has been our practice to insist that the beginner should always start with a wooden plough, because it costs less than £1, while the imported iron plough costs about £3. But experience has shown that farmers here are shrewd enough to appreciate that the iron plough is much better value for money in the long run. For an iron plough lasts almost for ever, with little cost for repairs and renewal; whereas it is not long before a wooden one is broken in some part or other. And though the repairs may not cost very much, any breakage greatly handicaps the farmer in his work. Again, while the difference in the efficiency of the two ploughs is not so very great when they are used on land which has been in cultivation for some years, yet in breaking new land the draught of the iron plough is much lighter and its work more effective. It thus seems very regrettable that the ordinary peasant should have to start with a wooden plough, when we know that he will want to replace it by an iron one as soon as he ever can afford to do so. No solution of the difficulty has yet been found nor any definite decision taken; but for the moment a compromise is being tried, whereby any man who makes an original payment of twenty-five shillings, instead of five shillings, towards the capital cost of his outfit at the beginning, is given a sufficient advance by the Native Administration to enable him to start with an iron plough from the beginning.

19. The position with regard to cows for mixed farmers is somewhat similar to that of the iron ploughs. There is no question that any cow that will breed and give enough milk to

feed a calf, if even no more, is a profitable investment for a mixed farmer, while a reasonably good cow will bring him in a clear net revenue of £1 or £2 a year at least; which alone is almost as much as he made altogether in gross return from his small farm before he took to mixed farming. Nor is there any doubt that these facts are fully recognised by farmers. Now our present policy is that the Native Administrations are only advised to give advances for the purchase of cows to farmers who have finished, or practically finished, repaying their advances for equipment; and that only if the Superintendent of Agriculture is satisfied that the farmer can obtain a moderately good cow and be trusted to make good use of it. At present, the only cows which can be obtained without great difficulty, and which can be guaranteed to be moderately good ones, are those which we " cull " from the herds at our own farms. For we have already reached, at our farms, a stage when we have to sell surplus stock every year to keep the herds to the numbers that the farms can feed; and now that we have reduced calf mortality on all our farms to reasonable figures, we shall soon have available annually quite a useful little annual supply of cows which are distinctly superior according to the local standard. This source of supply may even equal the demand for two or three years; but it cannot possibly do so for longer than that, however much the demand is restricted to those farmers who have proved their worth. It will be realised that this matter of the supply of cows to mixed farmers will be of very considerable importance to the country as a whole in the future; for the manure made by one pair of bullocks alone will not suffice to maintain the area of land which they can cultivate in a high state of fertility; and moreover, the farmer who has no cow is only getting at most about two-thirds of the profit that he should get from the new system. Lastly, it is not only economically sound but also most desirable in the interests of the health of the people of the country, that the bye-products of the farms should be turned into meat and milk with the relatively high efficiency which the farmer can attain, but which the nomad owner cannot.

20. With the assistance of the Native Administrations, steady progress is being made in the clearing of isolated small patches of tsetse bush in the Zaria and Katsina Provinces wherever there are mixed farmers living near such patches. This work is excepted from the provision of the Forced Labour Ordinance: the people are often fed or paid a small wage when thus employed. In any event, it is undertaken readily enough whenever the small amount of organisation and direction that is necessary can be supplied. Thanks to this measure, there has been a very marked reduction in the last two seasons in the number of cases of trypanosomiasis occurring among the mixed farmers' cattle; and thanks to the action of the Veterinary Department in providing Agricultural Officers and officials with the means of giving injections of tartar emetic to farmers' cattle, very few indeed of the cases that have occurred have proved fatal.

21. In my last Annual Report (that for 1933), figures were quoted which show how little profit the mixed farmers, then in their first and second years, had made during that year. These figures seem to have given rise to some misconception, owing to some readers overlooking the fact that last year was an exceptionally bad one as regards prices, and a rather bad one as regards yield per acre; the effect of these two factors being such that, whereas for many years we have always been able to get a return of £1 per acre or a little more from most of the fields on the farms under departmental management, last year's corresponding figure was only about ten shillings per acre. Again, it was perhaps not fully

realised that the figures quoted related to men in the first and second years after they had first adopted the system; and that it takes them three or four years to increase their farms up to the full possible area of twelve or fifteen acres, let alone to get it all into good heart and tilth. Generally speaking, the annual returns of an ordinary mixed farmer will, apart from natural annual variations, continue to increase for at least five or six years after he first takes up the new system. This year, with the better prices and better yields, the picture is a very different one to that seen last year. At the Taura demonstration farm (Kano Province) of 14.3 acres, which has been in existence for three seasons, the profit, excluding the cost of human labour, was £30 6s. 6d.; at Rahama (11 acres), in this its second season, the corresponding figure was £12 5s. 6d.; and at Maigana, where the farm of 9.7 acres was in its fourth year, the corresponding figure was £14 10s. 8d. These figures are confirmed by similar returns at other demonstration farms; and by some given us by ordinary farms. One man, for instance, in his second year has a nett return of £15 from about fourteen acres and another £9 13s. from about nine acres.

22. At all the older demonstration farms, the nett cost of running the farm was either very small indeed or else there was a small nett profit, in spite of paying the labourer and the boy such high rates as one shilling a day and four pence a day respectively for every day of the year; and at Taura there was a nett profit of £10. These rates are of course out of all proportion to what an ordinary hoe-farmer can earn, or to the ordinary rates of unskilled labour; but a demonstration farm has to be a good demonstration, and therefore we have to employ as good a labourer as can be found and to pay him well enough to make him proud of his post, and to encourage him to work hard and above all to be honest.

23. A short course of instruction about mixed farming, lasting roughly a week, was given to a class of six Administrative Officers at Samaru near Zaria early in July. The course was not restricted entirely to mixed farming, for the opportunity was used to give the officers some idea of all the work of the department in the Northern Provinces and about our general policies and methods. It is unfortunate that, on account of the limited accommodation available, and also of the difficulty which Residents find in freeing officers for such a purpose, the class consisted only of six junior officers. We should naturally have liked to have had some more senior officers who, when they had learned something about our work and obtained an interest in it, would be in a position to assist the progress of our extension work, through their control of Native Administration funds. However, there seems to be no doubt that the six officers who attended the course appreciated its utility and benefitted from it. The giving of such a course, irrespective of the number that attend, involves a good deal of work for the agricultural officers, as well as much interruption and dislocation of their normal duties; but it is felt that it was worth while; and it is hoped that we may be able to repeat it.

Improvement of Cows.

24. The work in the improvement of the milking ability of the cows at our farms in the Northern Provinces is now progressing very satisfactorily. From the nature of this work, it is only after about ten to twelve years, when the second home-bred generation begins to mature, that the rate of improvement of the herd can become very rapid; but we already have one or two cows that have given yields of as much as three gallons a day at the best, whereas it is only three years ago that we were very pleased when one cow

gave two gallons in one day. The figures given below show the average yield per day per cow, including both the milking and the dry cows in the two oldest herds—the original Shuwa herd at Samaru, and the white Fulani herd at the Shika stock farm. The figures are calculated from the average yield per day per cow, between dates of calving, of all cows that have calved twice. This method, which has some practical and theoretical advantages, has been proved by actual trial to give almost exactly the same result as the more usual method. So far as can be ascertained, these figures compare quite well, at least as regards rate of improvement, with those of the herds of improved Zebu cattle in India at the same stage after the establishment of the herds. There therefore still seems to be no reason why we should not eventually do as well as has been done in India. The military dairy farm at Ferozepur has great advantages over us in the very large number of tested cattle from which that herd was originally selected, and in the fact that the herd is larger than any that we are ever likely to be able to keep or control in any way in this country. But, on the other hand, the conformation of our cattle, especially as to their udders, seems superior to that of the Sanhiwal cattle, the chief milking breed of India. Now the Ferozepur herd of Sanhiwals, in the course of little more than twenty years, has been improved from an over-all average daily yield of five and a half pounds per day per cow to more than twenty-two pounds, and the herd of the same breed at Pusa, has been improved from a figure of six pounds per day per cow to twenty pounds. Now, an over-all daily average of twenty or twenty-two pounds per day compares well with any but the very best pedigree herds in Europe or America, and is much better than the figures of ordinary farm herds in those countries. There seems to be no reason why we should not attain to the same stage in 1950 as the Indian pedigree herds have reached to-day. To appreciate what this means, it should be mentioned that it can be stated with confidence that there is no herd of any size in this country, except those on the Government farms, which would give an average of three pounds per day per cow, and it is extremely doubtful if one could be found which would average two pounds per day.

AVERAGE YIELD PER DAY PER COW (INCLUDING COWS IN MILK AND DRY COWS).

	Shuwas.	*White Fulani.*
1929	4.78 lb.	–
1930	3.71 ,,	1.34 lb.
1931	3.66 ,,	3.94 ,,
1932	5.42 ,,	3.20 ,,
1933	5.11 ,,	3.62 ,,
1934	5.20 ,,	4.52 ,,

25. Until a year or two ago, our progress was much hindered by the infrequency of calving of the cows at all farms, and also, at the Shika Stock Farm only, by very high calf mortality. There has been considerable improvement even in the last year in the former matter and the majority of our cows can now be said to be calving annually, or are very near that standard. Thanks also to much help received from the Veterinary Department, and to the unremitting efforts of the officer in charge at Shika, the calf mortality at that farm has at last been greatly reduced, although it is not yet down to the very low figure which should be normal in a herd under scientific management. The figures for recent years at Shika are as follows:—

1931.	*1932.*	*1933.*	*1934.*
59%	55%	28%	15%

A new difficulty has however arisen during the year at Samaru, in the shape of a rather serious outbreak of contagious abortion; and although cows generally eventually acquire immunity to this infection in course of time, it is to be feared that it may be troublesome for a few years. It need hardly be said that everything possible to keep the disease in check is being done in accordance with the advice of the Veterinary Department. There is no doubt that this infection, like those which have given us so much trouble in calf-rearing at Shika, is one that is endemic in the country; but naturally it is a source of much more difficulty and loss when an infectious disease occurs in relatively large farm herds like ours, than it is either among those kept in twos or threes on native farms or in the big nomad herds: for these latter automatically move away from any place that has become infected, probably without even knowing that it is so.

Rice Growing at Kworre near Sokoto.

26. Experience at the irrigated farm at Kworre, which has now been carried on for a series of years, has shown that the making of profit out of the irrigated land there depends quite definitely and entirely on the use of bullocks for the puddling of the rice fields. If rice is broadcast on land tilled in the ordinary way by hand, but in fields under controlled irrigation, the yield is certainly better than on ordinary naturally flooded fields; but is only a little better, and the difference provides no adequate return for the capital expended on the irrigation scheme. It is not feasible to puddle rice fields effectively, if the work has to be done by hand; and it would be enormously laborious to attempt it. But once cattle are used, the situation is totally changed. For then, under controlled irrigation, and on fields where puddling and transplanting are practised, crops of 4,000 pounds of paddy can be obtained, as against the few hundred pounds per acre that are obtained by the ordinary farmer in the ordinary local way on naturally flooded land, or the 1,000-1,500 pounds per acre obtainable with controlled irrigation but without puddling. Once these facts had been fully established, we began last year (1934) to endeavour to show that the ordinary native farmer can do what we do. Three men, one an ex-middle-school boy, were each provided with farms, of slightly different sizes, cut out of our own farm. Each was supplied with a pair of bullocks and the necessary implements, and such labour, in addition to his own, as he found necessary. The three farmers themselves were paid daily wages as though they had been ordinary labourers, but each was left to manage his own farm alone as far as possible, and accurate accounts were kept separately of the cost and the return from each farm as a separate entity. The results were as follows:—

	Average yield per acre—lb. of paddy.	Gross Profit.	Cost of Extra Labour.	Net Profit.
		£ s. d.	£ s. d.	£ s. d.
Farm A $2\frac{3}{4}$ acres ...	2422	6 18 9	1 18 6	5 0 3
Farm B 3 acres	2732	8 10 9	2 4 0	6 6 9
Farm C 4 acres	4130	17 4 3	3 19 0	13 5 3

These figures do not include the ten shillings or fifteen shillings that each was expected to make as net profit on the small areas of dry weather crop which they are now growing. Farmer C not only

had to hire labourers, but also an extra pair of bullocks for a few days (of which the cost is included with the labour in the above figures). It therefore appears that about three acres is all that one man can cultivate with one pair of bullocks. But whereas we have allowed above for the payment of the extra labour, most, if not all, of it would, in the case of an ordinary farmer, be supplied by his wife or children; for it was not heavy labour. Even if a farmer paid for labour he would of course not pay as high a rate as we have to. These trials therefore seem to prove conclusively that with three acres of this irrigated land and a pair of bullocks, a man should be able to clear £7 or £8 per annum if he gets even an average yield, and much more if he gets what we regard on the farm as an ordinary good crop, *i.e.*, something between 3,600 lb. and 4,400 lb. of paddy per acre. Such returns would soon enable a man to repay the cost of his bullocks and implements and subsequently to pay, as rent or water-rate, an amount per acre which, if all the land in the scheme were so farmed, would give the Native Administration a handsome return for the original cost of the canal and for its maintenance. The next step of course is to try to get some farmers to adopt the new system independently.

Extension Work in the Benue Province.

27. We can only spare one officer, with relief when he goes on leave, for the Benue Province, and the programme of work has therefore necessarily to be restricted to a very few items. Of these, the chief are the encouragement of benniseed export and the introduction of green manuring, together with a certain amount of experimental work aimed at a more distant future.

28. The export of benniseed is increasing satisfactorily. The amount exported between 1st July, 1933, and 30th June, 1934, was 12,718 tons as against a previous record of 10,100 tons in 1928-29. The export for the period 1st July, 1934, to 30th April, 1935, was 11,503 tons. The increase in recent years has been mainly due to the spread of the crop to new districts; to the larger areas planted as a result of the great labour saving device of stooking, which was introduced by the department and which puts the economics of the crop on to a totally different basis; and to the growing of the crop in the early part of the season instead of later, again as a result of the advice given by the department, based on the experiments at the farm. These experiments have shown clearly that unless the crop is planted as early as possible the yield is greatly reduced. Indeed, the yield obtained annually on similar land with similar cultivation seems even to vary according to the date of the occurrence of the first " planting rain ". But even if he sows it as early as possible, the Tiv farmer still gets only one-quarter of the yield which he should get, because he does not weed his crop. For instance, this year, the yield per acre on our farm at Yandev was on the average 475 lb. per acre, while the average of a number of the typical neighbouring fields belonging to native farmers, and sown at the same time, gave an average of only 108 lb. Experiments have shown that the reason for this great difference is nothing to do with the fertility of our soil, but is simply the fact that our crop is thinned where necessary and is weeded once or, if necessary, twice; while the native field, once planted, receives no further attention at all until harvest time. The reason for such total neglect of such an obvious necessity as weeding is the overwhelming force of tribal custom among these people. Weeding has always been women's work with them, and the women weed the yam crop efficiently, as is required of them by the old rules of the tribe; but those old rules make no provision for the weeding of the crops that have been more recently adopted. They do not even

provide for the weeding of grain crops, let alone that of the benniseed crop, which has only been grown by the Tivs in quite recent years. The women already do more than a fair share of the farm work, and could not also undertake the weeding of the newer crops. It is below the dignity of a man to do any weeding, and it is contrary to tribal custom for him to do so. So the benniseed crop goes unweeded. Efforts, continued over several years, to introduce improved methods of farming show that as yet no single person among these people, however much he recognises the benefit of a new method, will act contrary to the tribal rule or custom. It is evident now that the only remedy will be to try to induce the tribe definitely to make rules about the weeding of benniseed crops by men, to be just as binding as those about the weeding of the yam crop by women. It seems not impossible that some tribes may be induced to make such a change; but naturally they cannot be expected to do it at a day's notice: for such a rule cannot be made until at least a substantial portion of the people are in favour of it. Exactly similar considerations apply to the introduction of green manuring in this province. Individuals have undoubtedly been convinced, by trials which they have made on their own farms under our guidance, of the wisdom and even of the necessity of adopting this measure; but it still seems that no individual can take it up until it is given the sanction of a tribal rule; and in this case it will probably take even longer to educate a sufficient number of people to believe in the new method, to make the passing of the rule feasible. The shortage of land in many parts of the province is already so acute that there is no doubt that work must be continued until success is achieved by some means or another.

Ilorin Province.

29. In spite of trials of several apparently promising lines of work, one after another, over a period which is now approaching twenty years, no permanent advance in extension work of any sort has been achieved in Ilorin. Yet with its admirable communications and apparently good farming population, the province seems to be one in which we ought to be able to achieve success. With the concurrence of the Native Administration, it was therefore decided, a year or two ago, to undertake the relatively long distance experimental work of trying to evolve a method of mixed farming which would be practically feasible and profitable in the conditions of this province. Those conditions are markedly different from those of the North in many respects, and we have to regard ourselves as having quite a different problem in this province from that in Zaria, Kano, etc. But any system evolved in Ilorin will also be applicable to several other provinces, so that it would seem certain that this work must give an economic return somewhere, some day. So far, the results of the experiments seem only to emphasise the differences between Ilorin and the more northerly provinces: and some of the results obtained so far have been unexpected. Farmyard manure seems, in these first trials, to be less effective at Ilorin than farther North, even on the same crops. There has always been some doubt as to whether it would have quite the same effect on yams as on grain crops; and the results at Ilorin so far seem rather to suggest that this doubt may prove justified. It is hoped that it will be possible in the future to evolve a breed of cattle that will be suitable for work in such areas as Ilorin, which are moderately, but not very heavily, infested by tsetse. But we can hardly hope that the cows will be as good milkers as those of the North. The part played by the cow in the North in converting the by-products of the farm into profit and increasing the supply of manure will therefore have to be taken at Ilorin, to a large extent, by pigs or sheep, and thus the working of

small stock into the farming system is another problem which has to be studied. For, at present, sheep and pigs are in effect only domestic, not agricultural stock. They are kept in the villages and towns, and but little use is made of their manure. The problem is one which is bound to take several years, before a complete system suitable for this province can be worked out, similar to that which has been successful in the North. The Government provides the European staff for the work, which consists of one Superintendent of Agriculture with relief when necessary, and the Ilorin Native Administration all other expenses.

Cattle for the Middle Belt.

30. In such provinces as Ilorin and Bida, humped cattle are kept wherever there is a stretch of country relatively free from tsetse fly. Inquiry into the details of any herd, however, has always elicited the fact that the cattle of these herds are by no means pure-bred Zebu; but have varying amounts in them of the blood of the humpless dwarf cattle of the country. Inquiry also shows that in spite of the admixture of " resistant " blood, the cross-bred herds suffer very great losses from trypanosomiasis, so great that there is little tendency for them to increase in numbers. Attempts to use such cattle in cultivation have shown that they are frequently infected with dormant trypanosomes and break down before long when put to work. It is evident that mixed farming would hardly be possible as an economic system if it had to be based on these cattle. The dwarf humpless cattle which are kept in areas that are heavily infested with tsetse are very highly resistant to the disease, and trials in the Benue Province seem to indicate that dwarf bullocks can stand the strain of work without ill effects. But they are so tiny as to be of little use for work. It seems just possible that a cross-bred animal, with much more of the humpless strain in it than those already kept in Ilorin and near Bida, etc., might make a useful working animal for the middle belt. As a matter of interest, the question naturally arises " Why do the Fulani cattle owners, who keep their herds in these provinces, generally only maintain a relatively small admixture of the pagan dwarf blood in their herds? " The probably true answer is that they maintain their herds primarily for milk and secondarily for the sale of beef, and not for the production of a working animal. Work has been started both at Ilorin and at our farm at Yandev, in the endeavour to produce such a cross-breed, bred solely for work, as we have in mind. The problem is being attacked in two different ways at the two stations, so that the work at each station is complementary to that at the other.

31. In furtherance of this work, the Ilorin Native Administration has been enterprising enough to provide funds for buying cattle of a superior humpless breed in the Gold Coast, and a herd has been purchased by the Superintendent of Agriculture and trekked across Dahomey to Ilorin. These cattle, though small, are yet much bigger than the humpless cattle of Nigeria; and moreover, though they are not entirely free from the malformations of dwarfs, are not thus malformed to the same extent as the Nigerian humpless cattle. The introduction of cattle even from such a short distance as the Gold Coast may quite possibly prove unsuccessful, owing to the cattle not having the same resistance to the Nigerian strains of trypanosomes as they have acquired to those of their own home; but there would seem to be no doubt that if these imported cattle can be maintained here, crosses between them and the Zebu should be heavier and stronger animals than similar Zebu-Pagan crosses. It is even possible that by selective breeding combined with good nutrition the size of even pure bred Gold Coast humpless cattle may be increased in course of time.

The Samaru School.

32. Five students who originally came to the Samaru School from the Higher College, Katsina completed a two years course in March and have all been offered appointments as Assistants in the department. The standard of general education of these students was quite satisfactory and they were able to take full advantage of the more specialised training which they received at the Agricultural school.

33. A junior class consisting of students recruited from middle schools also completed a two years course but the results were not nearly so satisfactory. Not only is the standard of education of such students hardly good enough, but on the completion of their course they are too young and irresponsible to be put in charge of extension work among farmers, and experience has shown that they must be kept at the farm centres for two or three years before they are of much real value to us. We have therefore decided to discontinue the junior class entirely although we are always prepared to give such students a purely practical course on our farm centres which will enable them to start farming on their own. This applies also to the sons of farmers even if they are completely illiterate.

Cotton in the Southern Provinces.

34. The purchases of seed cotton in the Southern Provinces for export in recent years have been as shown in the table below, the quantities being expressed in terms of the equivalent numbers of bales of lint each of 400 lb. net weight :—

	Native Cotton.		Improved Ishan.	
	Bales.	Prices.	Bales.	Prices.
1929–30	3,510	1¼d. falling to ⅝d. (2)	6,026	1⅝d. falling to ⅞d. (1)
1930–31	312	⅝d. falling to ⅜d. (2)	4,289	¾d. falling to ⅝d. (1)
1931–32	4	¼d. falling to ⅛d. (3)	1,333	½d. falling to ⅜d. (3)
1932–33	4	Not quoted	860	1 0/16d. falling to ⅜d. (3)
1933–34	118	⅝d. no change (3)	2,884	¾d. no change (3)
1934–35	150	⅝d. no change* (3)	4,050	1 3/16d. falling to ¾d.* (3)

(1) (2) (3). Prices for first, second or third grade respectively according to the grade into which most of the cotton in question was classed.

* Approximate. Subject to slight revision.

It will be seen from the figures that the production is steadily reviving again after a set-back which started in 1930-31.

35. There is no doubt that this trade would be put on to a much sounder basis if the grade of the cotton, which is now low, could be improved, so that more of it fetched first, or even second, grade price. The cause of the low class of the cotton is the same as that which has led to deterioration in the Northern Provinces in recent years, *i.e.*, the fact that the whole of the seed-cotton is, and in the Southern Provinces always has been, bought at the villages by the buying agents of the exporters, instead of being brought to the markets by the producers. But there is an even worse effect in the Southern Provinces, because the buying agents will not begin to deal in cotton at the end of December or beginning of January when it should be picked and marketed. They will only start buying it when the cocoa season ends, sometime in February; and the farmer, being unable to sell his cotton, leaves it on the plants until every boll has opened and the whole crop can be gathered in one picking; instead of in two or three pickings as is necessary if the product is to be reasonably clean. Our efforts to induce farmers to separate clean and stained cotton have also had little effect. There is no question that sooner or later the same reform will have to be introduced in the Southern Provinces as it is

proposed to introduce next year in the marketing system of the Northern Provinces; but it is considered desirable to get some experience in the North first, before extending the new system to the South. It is also essential that, before we try to change the marketing system, we should get our limits for the grades fixed at satisfactory practical levels. That it seems we have not yet succeeded in doing in the Southern Provinces. To achieve this end, artificially prepared mixtures of seed cotton of the 1933-34 season, containing varying proportions of good, dirty and immature locks, were ginned and the lint sent home for valuation and spinning tests. The figures thus obtained, though interesting and instructive, were not consistent enough to provide the sure basis which we require before we can amend the standards laid down in the regulations. It is proposed to send a further similar series from the crop of the season 1934-35.

Green Manuring in the Southern Provinces

36. Both experimental and extension work in green manuring are being continued at Ibadan, Onitsha and Umuahia. It cannot be said that very much progress has yet been made in the extension work, although in all three districts a number of farmers are interested in the work and have taken it up to just such an extent as justifies the continuation of our efforts, without yet making eventual success look certain. In the Western Provinces a number of farmers who have, under our instructions, green manured a half of one of their fields, subsequently obtained much heavier yields of ordinary crops on that half than on the other half, expressed themselves well satisfied with that result, and yet have not subsequently adopted the method themselves. In the Eastern Provinces the situation is rather different; for there, the land being extremely poor, and sometimes even uncultivable, farmers display more interest in our work with green manures, but our experimental work there is not yet so far forward. Considerable progress has been made in it, however, both on our farms and on small patches of bad land lent us for the purpose by farmers, in order to enable us to repeat our experiments on different classes of soil. It may now be said to be proven that by using Tephrosia Candida we can effect some improvement on all except the very poorest and worst soils; and it is now also substantially proven that a soil that is in a reasonable state of fertility can be maintained in that state by the regular use of Calopogonium for green manuring. But on the worst soils we have, so far, only managed to get a very thin crop of the Tephrosia Candida established, and it still remains to be seen whether it will grow heavily enough to have any appreciable effect in improving the worst soils, if allowed to grow for three or four years. These two plants are both remarkably immune to soil acidity, and it now seems justifiable to say that there is every prospect that we shall eventually be able to demonstrate a valuable improvement in the farming of these very acid soils by using them for green manuring.

Co-operative Marketing of Cocoa.

37. The total numbers of active members, and the quantities of cocoa handled by all co-operative societies, including those in the Cameroons, during the last five years, have been as follows :—

Season.	*Members.*	*Tons of Cocoa.*
1930-31	1,494	551
1931-32	1,710	724
1932-33	2,548	1,289
1933-34	4,877	1,608
1934-35	6,277	2,189

38. The results in the last three years are given in full detail in the table below :—

CO-OPERATIVE SALE OF FERMENTED COCOA.—

	Oyo Province.	Ondo Province.	Cameroons.	Ijebu Province.	Abeokuta Province.	Totals or Average.
Total number of active members of societies:—						
1932-33 ...	616	682	1,100	150	Nil	2,548
1933-34 ...	1,859	995	1,833	190	Nil	1,877
1934-35 ...	2,266	826	2,480	179	526	6,277
Total quantity of cocoa sold, tons:—						
1932-33 ...	471	501	250	67	...	1,289
1933-34 ...	747	446	367	48	...	1,608
1934-35 ...	930	328	640	50	241	2,189
Quantities per member, tons:—						
1932-33 ...	·76	·74	·22	·44	...	·50
1933-34 ...	·40	·44	·20	·25	...	·33
1934-35 ..	·41	·39	·26	·28	·45	·35
Proportion of grade I cocoa, *per cent.*:—						
1932-33 ...	97	98	...	90	...	...
1933-34 ...	96	99	89	99	...	...
1934-35 ...	94	99	100	96	92	...
Total cash received:—	£	£	£	£	£	£
1932-33 ...	8,188	8,610	4,250	1,229	...	22,277
1933-34 ...	9,076	4,985	4,455	597	...	19,113
1934-35 ...	14,873	4,948	10,313	811	3,963	34,908
Average price per ton:—	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1932-33 ...	17 18 5	17 4 10	17 7 3	18 6 10	...	17 5 8
1933-34 ...	12 2 0	11 3 9	12 2 9	12 18 9	...	11 17 8
1934-35 ...	15 19 9	15 1 10	16 2 1	16 10 2	16 8 11	15 18 11
Average premium per ton over F.A.Q.:—						
1932-33 ...	3 0 11	2 13 10	4 0 0	2 4 3	...	...
1933-34 ...	2 9 5	2 15 2	3 0 0	2 6 9		...
1934-35 ...	(*a*) 2 11 10	2 9 5	3 15 0	2 2 10	1 8 9	...
	(*b*) 2 5 6					
Average cost of Marketing per ton incurred by societies:—						
1932-33 ...	0 7 10	0 4 5	...	...	..	...
1933-34 ...	0 10 1	0 7 3	..	0 3 4	...	...
1934-35 ...	(*a*) 0 17 4	0 5 8	...	0 6 4	0 4 2	...
	(*b*) 0 11 11					
Total reserves of societies:—	£	£		£	£	£
1932-33 ...	280	165	...	...	...	445
1933-34 ...	372	205	...	...	...	577
1934-35 ...	426	216	...	15	47	704

(*a*) Average of societies belonging to the Ibadan Union ; both the premium and the expenses are higher for these societies owing to the inclusion of transport charges.
(*b*) Average of societies working independently.

39. Our original object in starting this work in Nigeria proper (*i.e.*, excluding the Cameroons) was not primarily to introduce co-operation. Our objective, when the work was originally started thirteen years ago, was simply to produce some first grade cocoa in each of the chief local cocoa markets and to sell it as first grade, in order to show the exporters that the Nigerian farmer could produce such cocoa if the buyers would offer a premium for it; and to show the Nigerian farmers that the exporters would pay for such cocoa if the farmers produced it. For at that time it was not generally realised that first grade cocoa could be produced if it had to be fermented in very small lots, without the use of any special appliances. It was considered that the production of about 1,000 tons or so of first grade cocoa under departmental supervision would probably serve our purpose. That quantity has now been obtained, and the production and buying of first grade cocoa is now firmly established in most of the cocoa districts, though it is only this year that it can be said that this stage has been attained in the neighbourhood of Ibadan. But although our object was not the encouragement of co-operation, a co-operative form of organisation was necessarily used, as being the only practical one for our purpose; and to succeed, the Cocoa Associations had necessarily to conform with the fundamental principles of co-operative sale, such as voluntary membership of the associations, democratic control, and very strictly correct sale by tender at regular intervals. But so long as such fundamentals were right, we did not concern ourselves about any of the lesser tenets of technically correct agricultural co-operation. It was not that we doubted the desirability of conforming with those tenets in all the many details with which they deal, but simply that they did not seem important to us for our very limited purpose.

40. The decision taken by Government in 1933 to appoint a Registrar of Co-operative Societies in the near future naturally altered the whole situation; for we need now no longer contemplate restricting co-operative sales of cocoa to one thousand tons. But if co-operative production was to expand indefinitely, it was clear that the organisation of the movement must be modified accordingly. For instance, in some parts the people had preferred to form many small independent societies. In other districts they had preferred one big society which might, however, have a few branches in the more distant parts of the area it served. There is no question that neither of these systems is really such a satisfactory one as the more conventional arrangement of numerous small societies, one in each village, combining to form a union with headquarters at the market town. This organisation is preferable because while, in some matters, efficient control is only possible where the unit is small, so that every member knows every other member, yet there are other matters for which it is essential that the unit be large. The union of small societies is the only means of satisfying these conflicting needs. A very practical instance of this arises in connection with the book-keeping. Village societies cannot afford to pay, and often cannot find, efficient clerks. They either have to find a voluntary secretary, or, more commonly to pay a few shillings a month to somebody who is capable of little more than weighing the members' cocoa and writing down each member's name and the weight he brought in. But a union can afford to employ an efficient secretary, and, if necessary, to give him assistants; and each village secretary can bring in his books every time he brings in cocoa to the union's store and they can then be checked and corrected to date by the union's clerk.

41. Model rules and account forms were therefore prepared before the beginning of the season, and it was put to the societies in the Cameroons, to those near Ibadan, and to those in Ondo, that they must either adopt our style of organisation, and conform to the more essential of our rules, or else we should have to discontinue our assistance. In the areas where the alternatives were thus placed before the societies, only a very few preferred either to break up or carry on without our assistance rather than accede to our demands; but, owing to lack of staff and time, we were unable to attempt to introduce the new system into other areas beyond those mentioned. Even in the areas where it was introduced, the change was accepted with hesitation and reluctance. For most societies were literally horrified at the suggestion that they should entrust the sale of their cocoa to a committee of the union which might consist of strangers from possibly fifty miles away. However, this objection was met partly by the rather unusual measure of having monthly general meetings of the union to do much of the work which would normally be done by the committee. Once the union was tried, the farmers were very soon convinced of its merits, and now, after only one season of the new form of organisation, there is, both in the Cameroons and at Ibadan, a much greater enthusiasm for co-operative marketing than ever before. The position in Ondo is not yet quite so satisfactory. For, owing to the widely scattered societies there, it has not been possible to form a union yet, so that the reform as yet only takes the shape of a reorganisation of the separate societies, which of course has no advantages comparable to the formation of a union.

42. The two tables below show the improvement that has occurred in the quality of the whole cocoa crop, in recent years, the first table for the Western Provinces as a whole, the second for the various areas into which those provinces are divided for the purpose of trade and produce inspection. The figures show the proportion of first grade cocoa expressed as percentages, to the nearest whole number, of the whole of the main crop cocoa. In the first table the figures for the first three years refer to the whole of the cocoa graded between 1st October and 31st March; but in the last three years not only is all cocoa graded outside that period neglected, but also no account is taken of any parcels—they never amount to more than a few hundred tons—which, though graded in the last weeks of the season, fail to pass the standard for size of beans of main crop cocoa, *i.e.*, a weight of eleven ounces per three hundred beans. The standards for Grades II and III were changed on 1st October, 1932; so the proportions of these grades prior to that date are not comparable with later figures, and are therefore omitted in the table below.

Grading of Main Crop Cocoa—Western Provinces.

	Grade I.	Grade II.	Grade III.	Total Main Crop—Tons.
1929-30 ...	9	—	—	41,300
1930-31 ...	9	—	—	37,750
1931-32 ...	13	—	—	46,050
1932-33 ...	18	72	10	53,650
1933-34 ...	17	73	9	47,550
1934-35 ...	27	68	5	56,200

PERCENTAGE OF GRADE I IN MAIN CROP, BY AREAS.

	1932-33.	1933-34.	1934-35.
Lagos area	5	5	15
Itori area	75	62	82
Abeokuta area ...	—	—	7
Ijebu-Ode area ...	3	4	6
Ibadan	12	10	21
Oshogbo	9	5	6
Ondo	14	19	32

43. Out of the total quantity of Grade I in 1934-35, the co-operative societies produced only about 10%. Yet a comparison of the quality of the general crop in each area, as revealed by the latter of the above tables, with the position of our work in stimulating co-operative sale, shows how direct is the connection between the co-operative movement and the production of Grade I cocoa by those outside the movement.

44. The cocoa graded in the Lagos area comes largely from other areas, so that the figures for that area have little significance for our present purpose. In the Itori area, fermented cocoa was already being produced and bought, as such, by Messrs. Cocoa Manufacturers, Limited, fourteen years ago. Since the introduction of grading the quality has on the whole improved steadily in that area. In Abeokuta co-operative work was only started this year. In Ijebu-Ode such work was started only in 1932-33. In Ibadan it was started in 1933-34. In the Oshogbo area it was started twelve years ago, and for several seasons one agricultural officer was devoted to that work for several months each year; but we deliberately relaxed our effort in that area a few years ago. It is now clear that the relaxation there was premature and the quality of the cocoa in that area has deteriorated again. In Ondo we have worked quite steadily for several years, and, in spite of there being too few competitive buyers there (at all events until this season 1934-35), the quality of the Ondo cocoa has improved steadily. In Itori, Ibadan and Ondo the production of first grade cocoa can now be regarded as firmly established, and almost certain to increase annually. In the other areas, the quality of the general production can only be expected to improve when the co-operative production is on a larger scale than it has yet reached.

OIL PALM PLANTATIONS.

45. The following table shows the progress in the planting of oil palms; original plantations and improved groves are combined in these figures :—

	Number of Owners.	Number of Acres.
December 31st, 1928	6	21
,, ,, 1929	27	119
,, ,, 1930	53	236
,, ,, 1931	85	352
,, ,, 1932	218	691
,, ,, 1933	382	1,014

December 31st, 1934 :—

	Number of Owners.	Number of Acres.
Colony	4 (—)	2 (—)
Abeokuta	8 (3)	11 (4)
Ijebu	1 (—)	1 (—)
Oyo	27 (1)	32 (1)
Ondo	3 (—)	2 (—)
Warri	19 (19)	53 (51)
Benin	313 (169)	823 (514)
Onitsha	110 (35)	174 (111)
Ogoja	6 (2)	4 (3)
Owerri	132 (74)	213 (167)
Calabar	143 (79)	235 (163)
Total, December 31st, 1934	766	1,550

The figures in parenthesis in the latter part of the table give the provincial totals at the end of 1933, for comparison with the corresponding provincial totals at the end of 1934. The increases between the end of 1933 and the end of 1934 represent the amount of planting carried out during 1934, less the areas abandoned by their owners during the year, or very badly neglected. Fifty-one acres belonging to fourteen farmers were thus struck off our list in 1934.

46. Progress during 1934 was greatly lessened by the low prices offered for oil and kernels at the beginning of the season. More than half of those who were believed to be genuinely intending to start in 1934, and much more than half of those who had stated that they were intending to plant, subsequently decided that they were going to wait a year and see what happened to prices before they started.

Palm Oil Presses.

47. The figures of the numbers of palm oil presses in the hands of native owners, and known, or believed, to be in regular use at the end of each of the last three current years, are given in the table below :—

Oil Palm Presses in use by Native Owners.

	Culley, Massa, etc.	Large Duchscher.	Small Duchscher.	Total.
December 31st, 1932	44	9	5	58
December 31st, 1933	44	22	10	76
December 31st, 1934 :—				
Colony	—	1 (0)	0	1 (0)
Oyo	1 (1)	3 (2)	1 (1)	5 (4)
Benin	9 (9)	1 (0)	—	10 (9)
Onitsha	21 (15)	14 (6)	5 (3)	40 (24)
Owerri	4 (4)	8 (7)	4 (3)	16 (14)
Calabar	15 (15)	10 (7)	3 (3)	28 (25)
Total, December 31st, 1934 ...	50	37	13	100

The numbers in parenthesis in the latter part of the table give the respective provincial totals at 31st December, 1933. The

differences between these and the corresponding totals at the end of December, 1934, show the number sold during the period 1st January to 31st December, 1934, apart from one or two other changes, such as old machines going out of use or being brought into use again after repair. A few presses which are owned by Native Administrations and let out on hire in order to popularise the system, are excluded from these figures, as are also the two or three used by the department on our own farms and for demonstration. The low price of oil in 1934 undoubtedly had the effect of slowing down the rate of progress in this work. The people who extract oil from fruit brought to them for the purpose had to reduce their rate per kerosene tin of oil extracted from the three pence or even four pence per tin of oil produced, which they used to charge a year or two ago, down to as low as 1½d. a tin, and even in some instances down to 1d. per tin. In spite of that, however, they all continued working at full pressure, and most of the presses bought during 1934 were bought by such of these persons as were able to extend their operations. Naturally, in the circumstances, there was little incentive to others to make a start in this business, but as soon as the price of oil and kernels improved at the beginning of 1935, there was a quite remarkable resuscitation of interest in this matter, and all the presses in stock in the country were soon sold. The figures given above, however, are to the end of the calendar year only, and therefore do not include the sales which have been made since the new year. The fact that Belgium has just devalued its currency will, it is hoped, lead to a reduction in the price charged for presses, and if the prices of oil and kernels do not fall too low, the prospect for this work looks much better at the moment than it has ever done before. In this work, as in that of palm planting, we have received more assistance from Administrative Officers and Native Administrations in 1934 than ever before. There are one or two divisions in which the old native law or custom still holds, that no individual or family may plant a palm on their own land or use a press to extract their palm oil, without first getting the consent of the chief or of the clan council, or whatever may be the local authority; and naturally in those few areas our efforts have little or no result.

Export of Pineapples.

48. The experiments of the last and previous years showed that the export of pineapples grown as the native farmer grows them at present is not really commercially feasible. At present pineapples are grown practically wild, at wide and irregular distances, often marking the boundaries of fields or paths. Some plants are in the full sunlight, some in quite heavy shade. For commercial export, not only must the fruit all be small and be picked at the same early stage in the ripening process, but also it is essential that thereafter the ripening process must proceed at a uniform rate in all the fruits in any consignment, so that they may reach Europe in a uniform condition. When this work was started it was naturally assumed that if a number of similar-sized fruits were picked at exactly the same state of ripeness, as judged by appearance, they would all ripen at the same rate. But experience has shown that this is not the case; if they have been grown under varying conditions their rate of ripening varies, so that no amount of care in the selection of fruit of uniform appearance here, will ensure uniform ripeness when the consignment reaches Europe. Experiments in growing pineapples under different conditions on the farm at Agege have shown that, by very close planting, fruits can be produced which ripen while still of the small " shipping " size; and such fruit seems to ripen more uniformly and satis-

factorily. These experiments need confirmation and some details still remain to be worked out. For instance, a very light shading of the plants seems to be advantageous, but it remains to be seen whether it is practicable to provide just the right amount of shade on a field scale. Again, pineapples planted as closely as they seem to have to be in this country to produce the required small fruit, do not produce suckers quite as they do when more widely spaced; and if close planting becomes the standard process, the supply of suckers for planting may be a difficulty. It need hardly be said that these experiments are being proceeded with as rapidly as possible; but it will necessarily be a year or two before they can be brought to a conclusion and a proven method be presented to native growers. In consequence of this position, we have this season advised all prospective exporters to refrain from exporting any pineapples until fruit grown under field conditions is available, because we consider that they are more likely to lose money, than to gain it, by exporting ordinary "wild" fruit. The Cold Storage Company has agreed to make regular shipments of ten cases per ship of field fruit from our own farm and from the one or two farmers who have grown very small areas according to the best advice we are able to give as yet. One or two other shippers have sent consignments mainly consisting of the excess fruit produced on these approved plantations, beyond the ten cases per mail; but the total amount shipped at the end of February by all exporters only amounts to sixty cases, containing 502 fruits. Generally, it may be said that in this possible export trade, it is true, as we have found in other instances, that a period of several years of experiments and trials will be necessary before it will be possible to advise anyone to take up either the production or the trade as a commercial matter; but so far there still seems to be reason to hope that success may be attained in the end.

Produce Inspection.

49. The working of the system of produce inspection has gone on with fully its usual general efficiency and smoothness—and with also its usual annual crop of occasional minor difficulties and troubles. A successful effort was made this season to give more exactness to the definitions of the border lines between chocolate coloured, purple and slatey cocoa beans, so as to obtain more completely uniform grading by all examiners and inspectors. The success attained is shown by the fact that the check testing at Lagos of all cocoa exported through that port, showed only 0.3% to have been wrongly graded up country. No complaints were received from Europe or America about any produce from any district, but several letters to local agents from their home offices have been seen, indicating appreciation of the reliability of the inspection and grading. Some dissatisfaction has been expressed about the purity of oil reaching the bulk oil plants in the Eastern Provinces; but there is no doubt that this is due to the very unsatisfatory and unscientific methods that are regularly employed everywhere in sampling and testing vegetable oils. An accurate sample of a barrel of palm oil is not obtained by the ordinary commercial method of sampling, especially if the oil is soft oil. On the other hand the ordinary laboratory methods do not give an accurate, exact, determination of the moisture content of the sample, especially if it is a sample of hard oil. Both the questions of sampling and examination are being thoroughly investigated by the agricultural chemists at Ibadan; and it is expected that it will be possible greatly to improve upon the present methods used in the produce inspection and also on the laboratory methods by which the former are checked.

Agricultural College, Ibadan.

50. The last class taking the old three-year course finished in March, 1935, and the scholars have been appointed to the department. We now take into the college, as it must now be called, boys who have spent two years at the Higher College, Yaba, and who come to us to receive a course which is two years or two years and a quarter in agriculture and agricultural science, parallel to the courses in other technical subjects, which are given at Yaba. Only six entrants are being taken every two years, so it is hoped that no more men will be trained than the department can absorb. The first class under this scheme started on 1st January, 1935. It is not possible, much less economic, to attempt to provide college life for six boys, so the Principal of the Middle School adjoining Moor Plantation, has been good enough to allow these college boys to board at the school and to join, as far as possible, in the social life of the upper forms of the school.

Instruction for Farmer's Sons, Southern Provinces.

51. During the three months March to May the Superintendent of Agriculture took charge of a course of instruction at Moor Plantation for the sons of farmers and others who wished to derive a living from farming. Thirteen boys, all Yorubas, attended and so far as was possible instruction was given in the vernacular. The course consisted mainly of practical work and demonstrations in the field to which were added lectures and class-room instruction in such subject as crops, and very elementary mathematics, mensuration and book-keeping. Those who attended the course returned to their fathers' farms, except one who is acting as Secretary of a Co-operative Cocoa Marketing Society.

O. T. FAULKNER,
Director of Agriculture.

Moor Plantation,
Ibadan,
10*th June*, 1935.